

**STAR 2006: NOAA Ship *David Starr Jordan*  
Weekly Science Report**

*Tim Gerrodette, Co-Cruise Leader  
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**Science Summary: 7 - 13 September 2006**

The departure of the *David Starr Jordan* from Puntarenas, Costa Rica, for leg 3 of STAR 2006 was delayed one day waiting for a replacement for the second cook. Early on Sep 8 we set a course for Malpelo Island. This small volcanic island and its surrounding waters are designated a floral and faunal sanctuary by Colombia. On Sep 11, Bob Pitman, Nacho Vilchis and Mateo Lopez, a Colombian PhD student studying the ecology of Malpelo, disembarked for a 5-night stay on the island to collect data on seabirds. Carolina Garcia, a Colombian working for Fundación Malpelo, joined the scientific party on the *Jordan* until we return to Malpelo on Sep 16. Both Carolina and Anna Núñez, a biologist with the Maritime Authority of Panama, are active and enthusiastic visiting scientists, and we are happy to have them with us.

We are proceeding around the bight bordered by Panama and Colombia with everything running smoothly. Due to the dedicated work of the *Jordan*'s crew and ET Jim Anthony especially, the starboard winch is now in operation for plankton sampling. We no longer have to use the CTD wire to tow nets. Line-transect effort has been shortened due to heavy rain on several days, but winds have been light.

**Sightings and Effort Summary for Marine Mammals**

<b>Date</b>	<b>Start/ Stop Time</b>	<b>Position</b>	<b>Total nm</b>	<b>Average Beaufort</b>
090706	- -	- -	In port	-
090806	0721 1720	N09:49.20 W084:47.31 N08:46.01 W084:17.08	53.8	2.5
090906	0631 1736	N07:51.12 W083:44.99 N06:29.43 W082:51.34	66.7	3.7
091006	1253 1757	N04:34.60 W082:12.99 N04:33.76 W081:33.25	33.9	4.8
091106	1129 1621	N04:04.48 W081:30.67 N04:35.38 W081:01.43	16.2	3.3
091206	0627 1701	N05:39.79 W081:24.38 N06:52.09 W080:51.21	56.7	2.6
091306	1124 1742	N07:19.80 W079:24.00 N07:53.02 W079:02.08	20.6	1.9

Code	Species	Number of Sightings
002	<i>Stenella attenuata</i> (offshore)	1
006	<i>Stenella attenuata graffmani</i>	6
013	<i>Stenella coeruleoalba</i>	8
015	<i>Steno bredanensis</i>	3
017	<i>Delphinus delphis</i>	3
018	<i>Tursiops truncatus</i>	10
021	<i>Grampus griseus</i>	2
032	<i>Feresa attenuata</i>	1
036	<i>Globicephala macrorhynchus</i>	2
037	<i>Orcinus orca</i>	2
049	Ziphiid whale	1
061	<i>Ziphius cavirostris</i>	1
070	<i>Balaenoptera</i> sp.	1
076	<i>Megaptera novaeangliae</i>	5
077	unid. dolphin	3
<b>Total</b>		49

### **Biopsies (Juan Carlos Salinas Vargas and Ernesto Vázquez Morquecho)**

Species	Common Name	Weekly		Total	
		Samples	Takes	Samples	Takes
<i>Stenella attenuata</i>	Pantropical spotted dolphin	0	0	12	23
<i>Stenella attenuata graffmani</i>	Coastal spotted dolphin	4	8	4	8
<i>Stenella longirostris orientalis</i>	Eastern spinner dolphin	0	0	6	20
<i>Stenella longirostris</i> subsp.	unidentified spinner dolphin	0	0	21	33
<i>Stenella coeruleoalba</i>	Striped dolphin	0	0	1	3
<i>Delphinus delphis</i>	Short-beaked common	0	0	15	32
<i>Steno bredanensis</i>	Rough-toothed dolphin	1	2	4	5
<i>Tursiops truncatus</i>	Bottlenose dolphin	5	5	29	48
<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	4	10	22	54
<i>Physeter macrocephalus</i>	Sperm whale	0	0	8	8
<i>Balaenoptera edeni</i>	Byrde's whale	0	0	3	3
<i>Balaenoptera musculus</i>	Blue whale	0	0	8	16
<i>Megaptera novaeangliae</i>	Humpback whale	2	5	2	5
<b>Total</b>		16	30	135	258

### **Photo Project (Cornelia Oedekoven and Laura Morse)**

Blackfish were the most exciting sightings during this week. Two killer whale, one pilot whale and one pigmy killer whale sightings in one week constitute a record for us on the DSJ for the blackfish count on this cruise. The killer whales were very evasive to the small boat. Hence, only one id-able picture was obtained between the two sightings. The pigmy killer whales were even more evasive to the small boat. But pictures were taken from the ship also and among a variety of dorsal fins, four heads are visible in one picture. The pilot whales seemed almost curious with one of them coming within 10 - 15 m of the small boat while it was alongside the ship for personnel transfer.

Species	Weekly Photographs		Total-to-date	
	Individuals	Schools	Individuals	Schools
<i>Stenella attenuata</i> (offshore)				9
<i>Stenella attenuata</i> (unid)				1
<i>Stenella attenuata graffmani</i>		5		5
<i>Stenella longirostris orientalis</i>				3
<i>Stenella longirostris</i> (unid)				5
<i>S. attenuata/ S. l. orientalis</i>				2
<i>Stenella coeruleoalba</i>		1		7
<i>Delphinus delphis</i>		2		13
<i>Steno bredanensis</i>		1		8
<i>Tursiops truncatus</i>		5		17
<i>Grampus griseus</i>		1		7
<i>Feresa attenuata</i>		1		1
<i>Globicephala macrorhynchus</i>		1		3
<i>Berardius bairdii</i>				3
<i>Orcinus orca</i>	1		1	
Unid. Ziphiid				1
<i>Physeter macrocephalus</i>			20	
<i>Megaptera novaeangliae</i>	5		6	
<i>Balaenoptera edeni</i>				1
<i>Balaenoptera borealis/edeni</i>				5
<i>Balaenoptera physalus</i>			2	
<i>Balaenoptera musculus</i>			15	
<b>Total</b>	<b>6</b>	<b>17</b>	<b>44</b>	<b>91</b>

### **Seabirds and Marine Debris (Rich Pagen and Chris Cutler)**

Forty-four species entered our binocular field of view this week, the numbers greatly inflated by the slew of lost migrant land birds which came by the *David Starr Jordan* to see if she was land or just something that looked like land. In nearly all cases, our visitors were greatly disappointed and moved on. However, a thoroughly drenched Barn Swallow enjoyed a complimentary blow drier sauna before hitting the road, and a Red-eyed Vireo has stuck around enjoying the bounty of skipper butterflies that have swarmed the wet lab (and now most of the ship). Other passersby included Wilson's, Prothonotary and Yellow Warblers, Osprey, Peregrine Falcon, Cliff Swallow, Purple Martin, Willet and a probable Reddish Egret. Our advice to any migrant birds reading this: When embarking on your journey to your wintering grounds, keep in mind that Central America is aligned northwest to southeast, so heading straight south will very likely leave you on the deck of our ship, huddling amongst the cranes and winches, wondering where you made your wrong turn.

The seabird diversity was also high this week, helped along by time spent in nearshore waters as well as a stop at Malpelo Island (Colombia). Nearshore bird flocks have consisted of Black and Bridled Terns, and Brown Boobies; while Nazca Booby, Black and Brown Noddies, and White Tern rounded out the flocks further offshore, out near Malpelo Island. Parkinson's Petrels materialized on two occasions this week, one during a sighting of Rough-toothed Dolphins, the other around a mixed group of Risso's and Bottlenose Dolphins. To put the level of excitement during these Parkinson's Petrels into perspective, let's just say that it is a rare occasion that the ship zig-zags back and forth attempting to keep a BIRD within sight, but this was one of those precious moments. Perhaps the highlight of the week was spending

an entire day with an entourage of 60-80 Audubon's Shearwaters, which were continually circling the ship, calling and squawking, and buzzing the railing of the flying bridge.

Marine debris was so thick at times this week that it may have been simpler to record where trash wasn't, rather than where trash was. One area off of Panama was almost surreal in regards to trash (never before had we had to type in the words "plastic deck chair" or "toilet seat" into our marine debris data). Equally sobering was the sample from the Manta surface tow that night which included hundreds of pieces of plastic, most of them not much bigger than grains of sand. It's disheartening to recognize that the long tentacles of the human race have reached out even into the most remote areas of the planet, where few humans have ever actually been.

### **Oceanographic Operations (Candice Hall)**

The Gulf of Panama is thought by some, such as our resident Malpelo Island expert Mateo Lopez, to be within one of the highest rainfall regions in the world. Since our rendezvous with Malpelo Island and subsequent entry into the Gulf of Panama, we have been subjected to thunderous rain squalls and dramatic lightning. The intensity of this weather at some points has been such that few have attempted to venture out into the rain with metal on their persons. Should this torrid rainfall continue it will definitely prove Mateo's claim of 'an annual precipitation of 11m'. However, the liquid sunshine has been warm and typically accompanied by beautifully flat seas that resemble mercury, worthy of any artists' palette.

On a less poetic note, our recorded surface salinity has oscillated while the sea surface temperatures have remained relatively constant between 27-28 °C (80-84 °F). Since our departure from 30.18 psu Puntarenean waters and heading out into the briny blue (with a maximum of 32.72 psu), the salinity again dipped down to 30.15 psu upon entry into the Gulf of Panama. As we work away from the monumental Colombian Coast this morning, the salinity has dipped dramatically down to 26.7 psu, just as our skies have cleared. Viva Colombia!

<b>Date</b>	<b>CTD</b>	<b>XBT</b>	<b>Bongo tow</b>	<b>Manta tow</b>
08 Sep	1	2	1	1
09 Sep	2	3	0	1
10 Sep	2	3	1	1
11 Sep*	2	2	1	1
12 Sep	2	3	1	1
13 Sep**	1	2	0	1
<b>Week Total</b>	10	15	4	6

\* XBT at Malpelo Island.

\*\* Colombian Coast – too shallow for operations, operations further reduced by lightening storms.

### **Turtle Talk (Lindsey Peavey)**

During our Costa Rica import, Juan Carlos, Candy, Adam, Ernesto, Rich and I set out on a (slightly delayed due to refueling complications) journey to Playa Ostional in hopes of viewing a legendary "arribada." Although visiting during the perfect time of year (August and September are the peak months for olive ridley nesting), we were 'arriving' (no pun intended) during the full moon, instead of the ideal

new moon. Nevertheless, we let no rental car stumbling block, road flooding, or time restraint stand in our way of getting to Ostional and testing our luck. Fortunately one of our adventurous group members must have some excellent karma, because we did indeed see a breathtaking arribada! Strangely enough, just two weeks prior there had been an arribada closer to the more optimal moon phase, but by chance, the lovely ladies decided to come out and give us a show too. Seeing thousands of large, healthy females marching out of their deep blue comfort zone onto a 2km stretch of beach was a beautiful sight. At times there were so many turtles on the beach, newly arriving females would waddle right over the top of a nesting dama, who didn't even flinch. It's hard to dispute evolution when observing a ritual so perfectly executed such as a sea turtle digging a nest, dropping her eggs and flawlessly covering her incubating offspring to a virtually undetectable facade. The hind flippers of a female sea turtle are masterfully designed nest-digging instruments, and are utilized with precision and innate expertise. Seeing an arribada during a full moon, although the 'wrong' moon, phase was a magical experience. Moonlight reflecting off of thousands of wet turtle shells during their unmistakable survival strut is an image that will remain etched in my mind. Seeing a handful of hatchlings rush to the surf was pretty cute too!

In addition to the rare viewing of the arribada, we meet with Carlo Mario Orrego, administrator of the Refugio de Vida Silvestre Ostional, and biologist Rodrigo Morera to present some information on the STAR surveys and sea turtle project. They were very interested in the pelagic work we are doing due to the increasing fatal effects of commercial fishing off the shores of Ostional. Beginning 23 August, over 50 dead olive ridleys have washed up onto Playa Ostional due to fishing activities estimated as close as 3 miles to the Wildlife Refuge. Mario and Rodrigo explain that this unnecessary killing happens every year between July and October during the olive ridley nesting season. Dead turtles washing ashore make the problem visible, especially to the coastal communities protecting the endangered specie's nesting beaches; however, there are more turtles dying offshore and out of sight. When DSJ waved good-bye to Costa Rica and rejoined our survey trackline on 08 September, we saw four dead turtles and processed one dying turtle. Although we didn't see outwardly apparent causes of death such as monofilament or hooks, it's possible the turtles had completely ingested a line or been caught in a gillnet or shrimp trawl and drowned before being thrown overboard a fishing boat. Our work studying ETP sea turtle ecology and assessing potential anthropogenic impacts in pelagic zones is valuable for places like the Refugio de Vida Silvestre Ostional because they can refer to our results and work with area fishers to adjust their techniques and gear to avoid future turtle massacres.

We were able to flipper tag 38 adult females nesting on Playa Ostional, but did not come across any turtles that had existing tags. Back on DSJ, we have had too many turtle-less days, and it seems we must have exceeded some sort of quota at Ostional we are now being punished for (so worth it!). However on 11 September it was exciting to see Juan Carlos opportunistically capture a large male olive ridley from the small boat while chasing a dolphin school through the big eyes. Hopefully our 'turtle counter' starts back at zero, and I'll have more pelagic encounters to report next week.

Species	Common name	Week total	Cruise total
<i>Caretta caretta</i>	Loggerhead	0	8
<i>Lepidochelys olivacea</i>	Olive ridley	2	46
<b>Grand Total</b>		2	54

### **Acoustics (Laura Morse)**

This is the first acoustics report for this cruise, but despite our absence from the weekly reports, all is well. This week culminated in a win over those nasty gremlins that must have hopped over here from the Mac in San Diego. Jim Anthony gets the MVP award in this battle. It had appeared that we might have a bad lot of sonobuoys, but with persistence the problem was discovered and we are now back in business. Our first successful toss was on a group of killer whales. The killer whales we're not so chatty but the

sweet sounds of singing humpbacks (presumably from the southern hemisphere population) carried through the headphones to an audience of several on board, (and to one very happy acoustician!). Not to be forgotten, sonobuoys are not our only tool out here. Located on the bow chamber of the ship is the bow hydrophone which has been functioning smoothly this cruise. We've had good success in recording a range of species, and look forward to many more.